

DOCUMENTED BRIEFING

RAND

An Analysis of Pay for Enlisted Personnel

*Beth J. Asch, James R. Hosek,
John T. Warner*

National Defense Research Institute

20010815 031

DOCUMENTED BRIEFING

RAND

An Analysis of Pay for Enlisted Personnel

*Beth J. Asch, James R. Hosek,
John T. Warner*

*Prepared for the
Office of the Secretary of Defense*

National Defense Research Institute

DB-344-OSD

The research described in this report was sponsored by the Office of the Secretary of Defense. The research was conducted within the Forces and Resources Policy Center of RAND's National Defense Research Institute, a federally funded research and development center supported by the Office of the Secretary of Defense, the Joint Staff, the unified commands, and the defense agencies, Contract DASW01-01-C-0004.

ISBN: 0-8330-3012-4

The RAND documented briefing series is a mechanism for timely, easy-to-read reporting of research that has been briefed to the client and possibly to other audiences. Although documented briefings have been formally reviewed, they are not expected to be comprehensive or definitive. In many cases, they represent interim work.

RAND is a nonprofit institution that helps improve policy and decisionmaking through research and analysis. RAND® is a registered trademark. RAND's publications do not necessarily reflect the opinions or policies of its research sponsors.

© Copyright 2001 RAND

All rights reserved. No part of this book may be reproduced in any form by any electronic or mechanical means (including photocopying, recording, or information storage and retrieval) without permission in writing from RAND.

Published 2001 by RAND

1700 Main Street, P.O. Box 2138, Santa Monica, CA 90407-2138

1200 South Hayes Street, Arlington, VA 22202-5050

201 North Craig Street, Suite 102, Pittsburgh, PA 15213

RAND URL: <http://www.rand.org/>

To order RAND documents or to obtain additional information, contact Distribution Services: Telephone: (310) 451-7002; Fax: (310) 451-6915; Email: order@rand.org

PREFACE

The research presented in this Documented Briefing grew out of two concerns: whether military compensation is adequate to enable the military services to meet their manpower requirements year in and year out, and the question of whether action to change military compensation is required now. These two strands of research consider not only long-term trends affecting the adequacy of military compensation, but also short-term circumstances. Further, since major military pay legislation was passed in 1999 and took effect in Fiscal Year 2000 (FY 00), there is a question of whether that pay action is sufficient to meet both short-term and long-term challenges in recruiting, retaining, and motivating personnel. And if it is not sufficient, what sort of actions should be taken?

Given the breadth of the subject, this briefing draws upon the body of existing research on defense manpower and military compensation. However, the briefing also contains new material on military/civilian pay comparisons and first-cut predictions of the impact of the FY 00 compensation changes. Specifically, we examine how the pay of enlisted personnel compares to that of their civilian counterparts, how these comparisons have changed over time, how the FY 00 pay actions affect the comparisons, and how recruiting and retention have fared recently. The briefing also discusses the variety of policy options that might be considered.

This research was conducted in part under the sponsorship of the Office of Special Projects and Research, Office of the Under Secretary of Defense for Personnel and Readiness, and in part under the sponsorship of the 9th Quadrennial Review of Military Compensation. It was conducted within the Forces and Resources Policy Center of RAND's National Defense Research Institute, a federally funded research and development center sponsored by the Office of the Secretary of Defense, the Joint Staff, the unified commands, and the defense agencies.

SUMMARY

A major purpose of the 9th Quadrennial Review of Military Compensation is to determine whether the structure and level of military compensation remains adequate to meet the manning requirements of the military. Changes in civilian labor market opportunities may call the adequacy of military compensation into question. To address these issues, this briefing examines the compensation of active duty enlisted personnel in relation to that of their civilian opportunities.

During the past 20 years, enrollment in college within the 12 months following graduation from high school has risen substantially. In 1980, the enrollment rate was 48 percent; by 1997, it had risen to 67 percent. The increase in enrollment has fundamentally changed the market for new recruits. Although the high school graduate market remains important, its role as a source of high-aptitude youth for the military has declined because those in the graduate market who score high on the Armed Forces Qualification Test (AFQT) are increasingly likely to enroll in college. This loss from the traditional recruiting market is potentially troubling because high-scoring youth perform better in military training and mission-essential tasks. Further, the growth in college enrollment has been accompanied by—and probably responded to—the increases in returns to a college education. Since the early 1980s, the wages of those with some college education have risen relative to the wages of high school graduates, and the wages of those with four or more years of college have risen even faster. Thus, the traditional recruiting market has declined in size, college enrollment has increased and attracted high-aptitude youth, and the rising returns derived from a college education, especially four or more years of college, make college an attractive career investment. These changes imply that the opportunity cost of entering the military has been rising. Furthermore, from the perspective of the military, a decline in the quality of recruits leads to a risk of decreased subsequent military capability.

The education levels of the enlisted force have also been changing. Increasingly, enlisted personnel take educational courses while in service. The coursework may facilitate promotion to higher ranks, and it may reflect an understanding of the value of education in expanding one's civilian opportunities after military service. In 1985, just over 20 percent of junior enlistees with one to four years of service had at least one year of college. By 1999, more than 50 percent had some college. Nearly all of

this change reflects education obtained during military service rather than an increase in the percentage of recruits having some college. Education levels have been rising in higher ranks as well. In 1999, more than 80 percent of enlisted personnel with 20 or more years of service had a year or more of college, and more than 20 percent of E-8s had a college degree. These changes imply that military service and education have become increasingly compatible for many personnel.

Despite the increase in education levels among enlisted personnel, there is reason to believe that the military is becoming less able to compete with civilian opportunities. Not only have college enrollment rates been rising, but the quality of recruits has been declining since 1992. In 1992, recruit quality reached an all-time high: 74 percent of non-prior-service recruits were high school graduates who scored in the upper half of the AFQT test score distribution. In 2000, 57 percent of recruits met these criteria. It should be emphasized that the quality of these recruits is no different from that of the 1987 recruit cohort, and 57 percent is certainly well above the 1979–1981 level of 30 to 35 percent. The concern is that recruit quality might continue to decline.

The structural changes in the recruiting market and the growing importance of higher education as a prerequisite to many civilian career paths may mean that the current structure of military compensation should be revised. This raises three questions: How well does military compensation compare with the civilian compensation of those with some college? How has this comparison changed over time, i.e., has military compensation fallen relative to civilian pay of those with some college? Will the military pay legislation of Fiscal Year 2000 (FY 00), already being implemented, address the concerns about the adequacy of military pay?

To compare military and civilian pay, military pay was measured as the sum of basic pay, basic allowance for housing, basic allowance for subsistence, and the tax advantage due to the allowances not being taxable. The total of these elements is called regular military compensation (RMC). RMC accounts for the bulk of current monetary compensation of military personnel. We compared RMC to civilian earnings by placing it on the civilian earnings distribution, not simply by looking at average civilian wages. RMC probably exaggerates the value of military pay for junior personnel because many of them live in barracks or in ship bunks and cannot take advantage of the housing allowance.

In FY 00, military pay appeared to compare fairly well with the civilian pay of high school graduates but not as well for those with some college. Over much of a typical military career, RMC approximately equaled the 70th percentile civilian wage of high school graduates. That is, at any

given age (or level of experience), about 30 civilians out of 100 had a higher wage, and about 70 had a lower wage. By comparison, RMC was only slightly above the 50th percentile civilian wage of those with some college, for most ages. However, among junior personnel RMC stood at respectively higher percentiles.

There are two major reasons for the fact that the military pay for high school graduates is above the 50th percentile (median wage) and above the average wage, which approximately equals the 60th percentile. (The average is greater than the median because the wage distribution has a long right tail.) First, the military is selective and prefers youth with higher aptitudes, excellent health, and no criminal records. Second, military duty requires the subordination of personal freedom to regimentation, military personnel are constantly on call, and military duty entails heightened risk of illness, injury, and death. Both the selectivity and the rigors of military service call for above-average pay, and pay at around the 70th percentile or above has historically been necessary to enable the military to recruit and retain the quantity and quality of personnel it requires. But RMC is nearer the 50th percentile of civilian pay for those with some college, and thus military compensation—and a military career—is relatively less attractive for this group. Therefore, as more and more high school graduates choose to enroll in college, the military compensation structure seems increasingly out of tune with the youth population it prefers to enlist. Moreover, given the rising levels of education within the military, the civilian opportunities of enlisted personnel must increasingly be judged against the career and earnings paths of those with some college, not just those with a high school education.

The military/civilian pay comparisons for FY 00, along with the rising importance of higher education both outside and within the military, suggest that the military compensation needs realignment. However, the situation is more complex. The FY 00 comparisons, made at a point in time, do not reveal how the value of a military career has been changing relative to that of civilian careers over time. Although one might expect that the value of a military career has been declining relative to that of a civilian career for individuals with some college, that is in fact not the case. We compared earning streams over a military career with civilian earnings streams for different education levels and occupation groups. Again, military pay was measured in terms of basic pay, housing allowance, subsistence allowance, and the tax advantage of the allowances. Civilian pay consisted of wage and salary income, including overtime pay.

The present value of civilian career earnings of high school graduates who enter the production/craft occupational area—the most common occupational area for male high school graduates—has been declining. The present value was slightly lower for the 1998 cohort than for the 1983 cohort, and it is projected to be still lower for the 2006 cohort. The present value of a production/craft career for a male with some college has been roughly constant over time and is higher than the present value for male high school graduates. The present value of a professional/technical career for a male with some college is still higher and has been rising over time. The relative decline in the value of high school careers is consistent with the rise in college enrollment. Nevertheless, the value of an enlisted career is higher and has risen faster than the value of the production/craft and professional/technical careers for persons with some college. By this measure, then, the military has been gaining ground. Yet, the military is finding it hard to maintain recruit quality and to retain personnel in many technical skill areas.

This leads to several hypotheses regarding the military's apparent loss of competitiveness:

Stepping-stone hypothesis: Obtaining some college is a stepping stone toward four or more years of college. Earnings have grown more rapidly for those with four or more years of college than for those with less college, and persons considering a two-year college may factor this into their decision to enroll. In addition, enrolled students who initially had no intention of getting more than a year or two of college may revise their education goals as they see what four-year graduates can earn. As evidence of this hypothesis, the percentage of persons working toward a four-year degree after completing a year or two of college has been rising.

Value of civilian experience hypothesis: In an era of relatively fast technical change in certain occupations, such as those using information technology, the value of on-the-job experience may have risen relative to the value of military skills and experience. Civilian job experience may increasingly be seen by youth as a gateway to higher-quality career opportunities, although not necessarily to higher-paying jobs. By this hypothesis, the military may need to review, and perhaps restructure, its career paths to make them comparable to civilian opportunities. If career restructuring is infeasible or detracts from military readiness, then higher military compensation may be needed.

Cyclical factors hypothesis: The economic boom of the 1990s may have caused today's recruiting and retention difficulties as civilian pay rose relative to military pay and unemployment hit a 30-year low. The decline in military pay relative to civilian pay, the decrease in the unemployment

rate, and the increase in college enrollment actually can account for most of the decline in recruit quality between 1992 and 1999.

Will the FY 00 pay legislation improve recruiting and retention and thereby address questions of military pay inadequacy? The FY 00 pay legislation mandated increases in basic pay half a percentage point higher than the growth in the Employment Cost Index for years 2000 to 2006. It also mandated modest structural changes in the enlisted and officer basic pay tables that took effect July 1, 2000. In addition, it increased authorizations for bonuses, created (but did not fund) a thrift savings program, and redressed an inequity in the retirement benefit structure affecting personnel entering service since August 1986.

The FY 00 pay legislation was a major step forward in restoring military pay to competitive levels. However, because it is being implemented over six years, its effects will take time to materialize. Depending on the scenario chosen, the ECI + 0.5 percent pay increases can be expected to improve recruit quality to the levels prevailing in the early 1990s by the time they are fully implemented in 2006. But in the intervening years, recruit quality may be at the levels seen in recent years. If so, the string of comparatively low-quality cohorts will be extended and could result in a force with less capability than would be the case if recruiting improvements were achieved sooner.

Improvements in retention are also expected. In the absence of the FY 00 pay legislation, the Air Force and Navy would experience marked declines in continuation rates among members in their mid-careers, necessitating an increase in accession requirements. As the FY 00 pay actions are phased in over the next five years, they should improve overall retention in all services and offset the declines experienced since the early 1990s. However, shortages may persist in critical occupation areas.

The FY 00 legislation raised pay and addressed technical anomalies within the pay table. But it did not address the structural changes in the civilian labor market opportunities available to the type of individuals the military will continue to seek to recruit and retain in its enlisted force, namely high-aptitude high school graduates who seek or who have a college education.

The long-term changes in the civilian labor market and their implications for military capability argue for an additional pay action for military personnel. But what type of pay adjustment is needed? The usual type of pay increase for military personnel is an across-the-board raise that gives the same percentage increase to everyone in uniform. However, research suggests a number of advantages to a different pay raise approach, one

that would target or graduate the pay raise to give larger raises to those in higher grades. First, a graduated pay raise would target resources to areas where the educational and skill content of the enlisted force is greatest and where relative pay growth has been lagging. Second, a graduated pay raise would be more cost effective because this is generally a less costly approach to achieving retention targets than are across-the-board pay raises. Third, a graduated pay raise would build on the FY 00 pay legislation, enhance the rewards of promotion to higher grades, and increase the incentives in the pay system to work hard and effectively. Finally, such a raise would move military compensation in a direction that increases its effectiveness as a force management tool. A recent Defense Science Board report recommended several fundamental changes in the military compensation system to improve its effectiveness. Among them was a recommendation to restructure the military pay system to emphasize pay for performance. A graduated pay raise would be consistent with that recommendation.

Although the research summarized in this briefing focuses on enlisted pay, it is important to recognize that improving the competitiveness of enlisted careers will also entail other policy changes, particularly in recruiting and personnel management. In addition to pay increases, the military must also consider how to compete for high-aptitude college-bound recruits through the use of new and innovative recruiting policies as well as through revamping past policies. The military also needs to consider how to develop and use personnel who are seeking or who have postsecondary education. Such changes in personnel management and recruiting, together with a pay action, will help position the services better vis-à-vis the civilian labor market and will improve their ability to meet their current and future personnel requirements.

ACKNOWLEDGMENTS

We wish to thank Curtis Gilroy and John Enns, director and codirector of the 9th Quadrennial Review of Military Compensation, for their helpful comments and guidance throughout the process of completing the work presented here. We benefited from the input of Dr. Bernard Rostker, Under Secretary of Defense (Personnel and Readiness); Vice Admiral Patricia Tracey, Deputy Assistant Secretary of Defense (Military Personnel Policy); and Captain Elliot Bloxom (Director of Compensation, Office of the Assistant Secretary of Defense for Force Management and Personnel). At RAND, we appreciate the insights and support of David Chu, Susan Everingham, and Michael Polich. We are grateful to our reviewers, Jim Dertouzos and Michael Polich, whose comments led us to make substantial improvements in the document. We also wish to thank Rachel Louie, Jennifer Sharp, and Mark Totten for their programming expertise and contributions to the research. Finally, we benefited from the comments we received from the working group members of the 9th Quadrennial Review of Military Compensation.

Congress Passed Major Pay Legislation for FY 2000

- Problems
 - Recruiting difficulties
 - Decline in retention
 - Shortages in some skills
 - Retirement benefit inequities
- Legislation
 - Raised pay across the board
 - Restructured pay table
 - Removed inequity in retirement benefits
 - Enhanced special and incentive pays

Is another pay action needed, and if so, what form should it take?

Two years ago, the nation started its most recent debate about military pay. The usual problems were present: poor recruiting and declining retention. These were not minor tremors. For the first time since 1979, the services were not able to recruit the number of personnel needed. The quality of recruits was eroding, and retention rates were declining. In addition, mid-career service members were aggravated by inequities in their expected retirement benefits.

In response to concern about this situation, Congress held hearings and formulated several military pay bills. This led to the passage of Fiscal Year 2000 (FY 00) pay legislation that was a major step forward. Military basic pay was increased by 4.8 percent on January 1, 2000. Members with various ranks and years of service received additional targeted increases on July 1, 2000. The July increases were targeted toward the middle ranks and middle years of service. Officers in the ranks O-3 and O-4 received increases of about 5 percent, but the increases for mid-ranking enlisted personnel were much smaller, 2 percent or less in most cases.

Our research addresses the question of whether this pay action was enough to restore the competitiveness of enlisted pay and careers in light of long-term trends in the civilian labor market that are extremely relevant to the military's desire to get and keep high-quality personnel. This briefing summarizes our research findings and begins to address what

pay changes might be taken to improve the military's competitiveness. It also discusses what form such changes might take—an across-the-board increase or an increase targeted to give proportionally greater increases to the high ranks.

Briefing Outline

- Key trends
- How does the pay of enlistees compare to that of their civilian counterparts?
- How has the comparison changed over time?
- How will FY 00 pay actions affect the comparison?
- Are civilian pay increases temporary or permanent?
- What's happened to aggregate measures of enlisted recruiting and retention?
- What policy options might be considered?

We first look at key trends in the civilian labor market. We then examine how enlisted pay stacks up relative to the pay of two civilian comparison groups—those with a high school diploma and those with some college—and address the question of how the comparisons have changed over time.

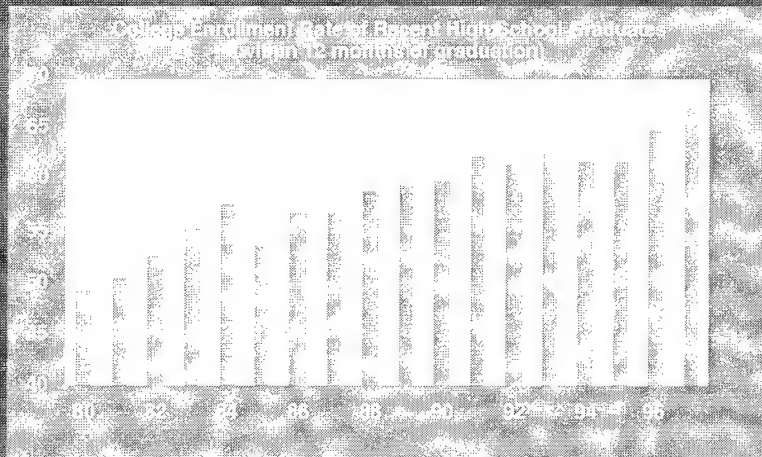
Between FY 01 and FY 06, military pay is scheduled to increase by 0.5 percentage point per year more than the Employment Cost Index, a measure of civilian pay growth. Furthermore, Secretary of Defense William Cohen urged Congress to increase the basic allowance for housing (BAH) from 80 percent to 100 percent of local area housing costs. We study the effect of these pay reforms on relative military pay.

We then look at recent indicators of recruiting and retention. One question is that of how much the FY 00 pay actions are likely to improve the recruiting outlook, and we offer a preliminary assessment. We also consider the consequences for personnel force structure if recent, somewhat low retention rates should persist.

Finally, we consider policy options. Today's enlisted recruiting and retention challenges derive in part from the economic boom, which has pushed up wages and created jobs. Responding to these challenges might merely call for a higher level of compensation. But we believe that there are long-term, structural issues in compensation that cannot be solved by

a simple increase in the enlisted pay table. The last part of the briefing raises these structural issues and puts the issue of restructuring enlisted basic pay in a broader context.

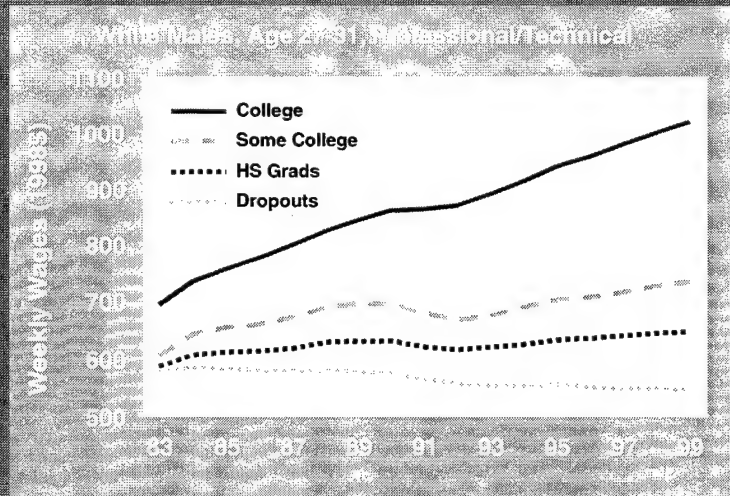
College Enrollment Rates Have Been Rising



Trends in the civilian sector have a major influence on recruiting and retention. Recent recruiting challenges arise in part from the current state of the business cycle and in part from long-term trends. We begin with long-term trends.

The first long-term trend is a dramatic rise in college attendance. In 1980, only about 48 percent of high school seniors enrolled in a college or university within 12 months of graduation. By 1990, that number had increased to about 60 percent. Today it stands at almost 70 percent. Unless the services can penetrate the market for college-bound youth, their recruiting pool is limited to about 3 of every 10 youth. In 1980, the services could recruit from 5 of every 10 youth without resorting to recruitment of college-bound youth.

Returns to 4+ Years of College Have Increased Dramatically

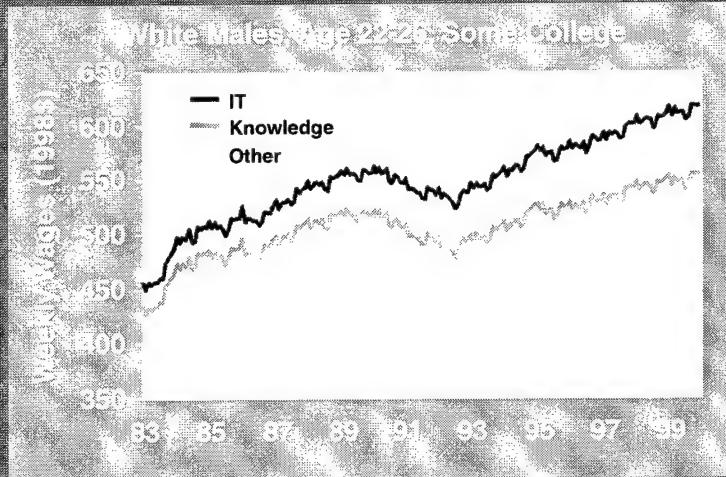


Wages have been rising most for those with four or more years of college, somewhat less for those with some college, even less for high school graduates, and not at all for high school dropouts.

Why has college attendance risen so much? One reason is the rising incentive to acquire a college education. This slide shows the weekly wages of 27- to 31-year-old white males who work full time in professional and technical occupations. Wages are in 1998 dollars. Weekly wages of professional and technical workers with four or more years of college have risen significantly since 1983. Wages of professional/technical workers with some college have also risen, although the increase has not been as dramatic. Wages of high school graduates have increased a small amount, and those of high school dropouts have in fact declined. Earnings differentials have been rising in other occupational areas as well, although the wage gains for college graduates and those with some college have not been as large.

Real weekly earnings fell during the recession of the early 1990s. Part of the big increase in high-quality recruiting during that time owes to this fact. The current recruiting challenges owe partly to the strong growth in civilian pay since 1993.

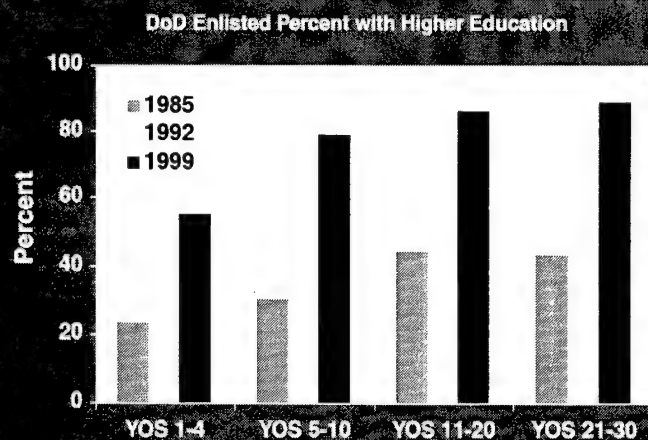
Wages Have Grown Fast in IT and Knowledge-Intensive Occupations



As the military becomes more technologically oriented, it must increasingly compete with the private sector for skilled personnel. The wages of skilled workers have been rising more rapidly than those of less-skilled workers. This chart shows weekly earnings in three different occupation groups, information technology (IT), knowledge-based occupations (Knowledge), and all other occupations (Other), for 22- to 26-year-old white males with some college. IT includes programmers, systems administrators, network personnel, website personnel, and cabling. Knowledge workers are mainly in business management, accounting, engineering, architecture, law, medicine, science, and social science. In today's market, IT workers earn the most; knowledge workers earn less than IT workers but more than other workers. Absolute wage spreads between IT and knowledge workers versus other workers have been rising over time due to a rising demand for workers with computer-related, high-tech skills. All workers, regardless of occupational area, were hurt by the recession of the early 1990s.

After adjusting for inflation, other workers' weekly wages grew from \$414 in 1992 to \$466 by the end of 1999 (12.5 percent). Knowledge workers' wages rose from \$464 to \$528 (13.7 percent), and IT workers wages rose from \$524 to \$617 (17.7 percent). Thus, IT workers began the 1990s at higher wages and had the fastest wage growth during the decade.

Enlisted Personnel Increasingly Have Some Higher Education



The traditional image of the enlisted force is one of high school graduates, but this depiction has become less and less accurate. According to data from the DoD Active Duty Personnel Surveys of 1985, 1992, and 1999, increasing proportions of enlisted personnel obtain at least some college education while in service. Today, more than half of the first-term enlisted force report at least one year of college, as do more than 80 percent of those with 20 or more years of service. In the 1999 survey, 21 percent of E-8s and 27 percent of E-9s reported having either a college degree or an advanced degree.

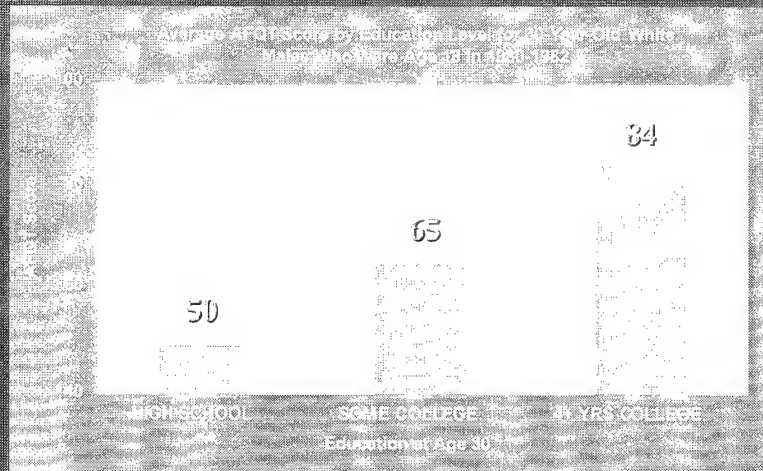
The increase in educational attainment is not due to an increasing percentage of recruits entering with higher education, i.e., some college or a college degree. The percentages of recruits with higher education were: 1986, 7 percent; 1990, 3 percent; 1994, 5 percent; 1998, 7 percent; 1999, 6 percent; 2000, 4 percent.

Instead, several factors may have stimulated the rising educational attainment of the enlisted force: the better opportunities for education while in service today than in the past, the increasing returns to education in the private market, and the incentive to acquire more education that is imbedded in the services' promotion systems, which give some weight to educational attainment. However, it is also likely that the services now place greater emphasis on recording education provided in service. This

may have changed perceptions about what should be counted when reporting one's higher education. Thus, some of the increase may represent more complete reporting by service members.

While it is hard to quantify, the increase in educational attainment of the enlisted force has no doubt contributed to the capability of the force.

AFQT Is Strongly Related to Education Ultimately Attained



Educational attainment is strongly related to Armed Forces Qualification Test (AFQT) scores. We illustrate this point with data from the National Longitudinal Survey of Youth, a longitudinal, representative sample of youth who, as part of the survey design, took the Armed Services Vocational Aptitude Battery (ASVAB) in 1980. The AFQT score derives from certain verbal and quantitative components of the ASVAB. The slide focuses on white males who graduated from high school by age 20, grouped by their education attainment at age 30. Those who had not increased their education by age 30 had an average AFQT score of 50. Those with some college had an average score of 65, and those with a college degree had an average score of 84.

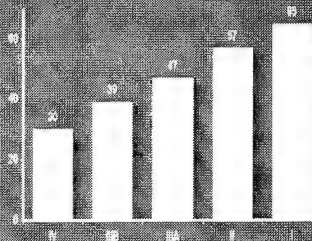
The relationship between verbal and quantitative scores and the likelihood of obtaining more education is quite strong. This relationship is of fundamental importance to the DoD. In order to recruit and retain more able personnel, the DoD must offer educational and training opportunities and pay commensurate with the increasingly attractive opportunities to be found in the civilian sector.

Higher-Aptitude Personnel Performed Better in Operating Patriot Missile

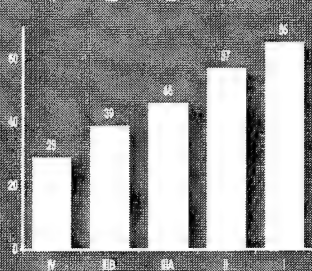
RAND Experiment on PATRIOT Operator Proficiency

- Tested all junior PATRIOT specialists (U.S./Europe)
- Gave tactical scenarios in computer-driven simulator; written knowledge tests
- Conducted multivariate analyses of proficiency

Hostile Aircraft Killed IAW Tactics (Percentile)



Asset Defense (Percentile)



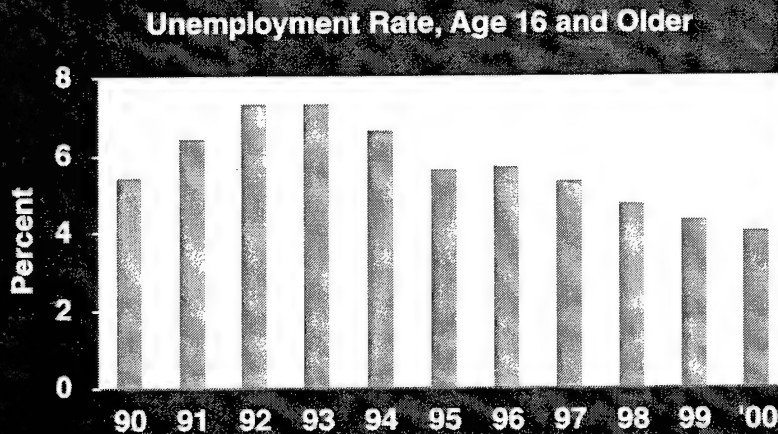
AFQT Category

High-scoring personnel pay off in terms of higher performance, hence greater military capability. Studies indicate that the performance of service members depends on their education, experience, and aptitude. In one such study, RAND conducted a controlled trial of PATRIOT missile crews (Orvis et al., 1992). The trial included all junior (i.e., first-term) PATRIOT specialists in the United States and Europe, and their performance was assessed via written knowledge tests and tactical scenarios on a computer-driven simulator. Results of the analysis showed a clear positive relationship between a service member's AFQT test score category and performance. Personnel with higher AFQT scores were more effective in asset defense and killing hostile aircraft in accordance with tactics. Positive effects of higher AFQT scores have also been found for tank crews (Scribner et al., 1986), multichannel radio communications (Winkler et al., 1992), and ship readiness (Junor and Oi, 1996).

The military services have generally done well since the middle 1980s in recruiting from the top half of the AFQT distribution. For example, in 1997, 68 percent of non-prior-service recruits had an AFQT score of 50 or higher. This compares well to the AFQT scores in the overall youth population. In 1980, when the AFQT test was "renormed," 50 percent of all youth had a score of 50 or higher (*Population Representation in the Military Services* 1997, 1998). These numbers underscore the point that the military targets its recruiting on the high-scoring population. We argue

later that it has become increasingly difficult to recruit from this population.

Civilian Job Opportunities Have Expanded Due to Robust Economy



The DoD's current recruiting and retention challenges are due in part to the current state of the business cycle. The economic expansion has lasted more than seven years, massively expanding employment and reducing the unemployment rate from over 7 percent in 1992 to 4 percent in 2000—the lowest unemployment rate in a quarter century. Even without wage growth, the growth in civilian job opportunities can be a powerful lure for personnel to leave the military or not enter it. Low unemployment increases the odds of finding a job. As a result, a lower unemployment rate results in higher *expected* earnings in the civilian labor market.

Unemployment has a large cyclical component; however, when the cycle of expansion runs its course, the pressure on military recruiting and retention will ease somewhat. Cyclical changes highlight the value of recruiting incentives, such as enlistment bonuses and educational benefits, that can be turned on and off as needed. Large entry-level pay increases, in contrast, are not as flexible.

Military/Civilian Pay Comparisons Should Consider Pay over Career

- Comparisons of current pay ignore the future pay-outs associated with different career choices
- Theory of occupational choice: compare present value of
 - Work
 - Military service
 - Further education, then work or military service
- Has pay over military career changed relative to other career paths?

Comparisons of military and civilian pay often focus on trends in current pay. We present a perspective of pay over a military career versus pay over a civilian career. These comparisons are made for different levels of education, especially for high school versus some college. This perspective is relevant because, as seen in the previous charts, wages for those with some college are rising, and that has created an incentive for college enrollments to rise. Young men and women are increasingly making career decisions that involve some education after high school, and presumably these decisions weigh the costs and returns of getting further education.

We depict profiles of enlisted career earnings compared first with civilian earnings of high school graduates and then with civilian earnings of those with some college. In addition, we compare the present value of an enlisted career with that of civilian careers for education levels of high school, some college, and four or more years of college. Career present values are computed for several different entry cohorts in order to see how the value of a military career has changed over time compared with the value of civilian careers.

We Use Two Approaches to Compare Earnings over Career

- Use “cross-section” approach and “life-cycle” approach
 - Cross-sectional analysis compares military and civilian pay at a point in time (e.g., July 2000)
 - Life-cycle analysis compares military and civilian pay over career for different entering cohorts
- Approaches make differing assumptions on how military personnel form expectations about future earnings
 - Cross-sectional approach assumes current-point-in-time civilian wage structure will remain constant
 - Life-cycle approach assumes career earnings will evolve according to wage trends by age, education, occupation
- Both approaches tell consistent message

We use two approaches in making these comparisons. The cross-section approach uses civilian wage data on individuals of different ages at a point in time, the year 2000, to portray experience-earnings profiles. Experience is defined as the number of years since completion of education. Also, civilian earnings profiles are shown for the 30th, 50th, 70th, and 90th percentiles of the earnings distribution. Military pay of July 2000 is overlaid onto the civilian profiles.

The life-cycle approach tracks a cohort's earnings over time from age 19. We estimate life-cycle earnings for three cohorts: 19-year-olds in 1983, 1998, and 2006, respectively. Actual earnings were used to 1999, and future earnings were predicted from models of wage trends. Life-cycle comparisons have been made for different education levels and occupation tracks.

The two approaches make different assumptions. The cross-section approach implicitly assumes that individuals forecast earnings at some future age by observing what individuals currently that age are earning. The approach also assumes that the age structure of earnings does not change much over time. This seems like a reasonable assumption in light of the modest wage trends for high school graduates and those with some college.

The life-cycle approach implicitly assumes that individuals are aware of earnings levels and trends and that they use this information in forecasting future earnings. Wage trends can differ by education level, occupational group, age (or experience), and the state of the economy.

Although the cross-section and life-cycle approaches are based on different assumptions, they tell a consistent story about how military career compensation compares with civilian compensation for workers with a high school education and for those with some college. The life-cycle approach, in presenting results for several different cohorts, further shows how the present value of military and civilian careers has changed over time, although the cross-section approach could also be used to do this.

Constructing Civilian Earnings Profiles with Cross-Section Approach

- Construct civilian experience-earnings profiles for *males* by education level using Current Population Survey data from March 1994-1999 surveys (1993-1998 earnings)
 - mean earnings profile
 - profiles for 30th, 50th, 70th, and 90th percentiles of earnings
- Adjust the predicted profiles to account for wage growth between the CPS earnings year and year 2000
- Compare with July 2000 military pay and with FY 01 - FY 05 pay reforms

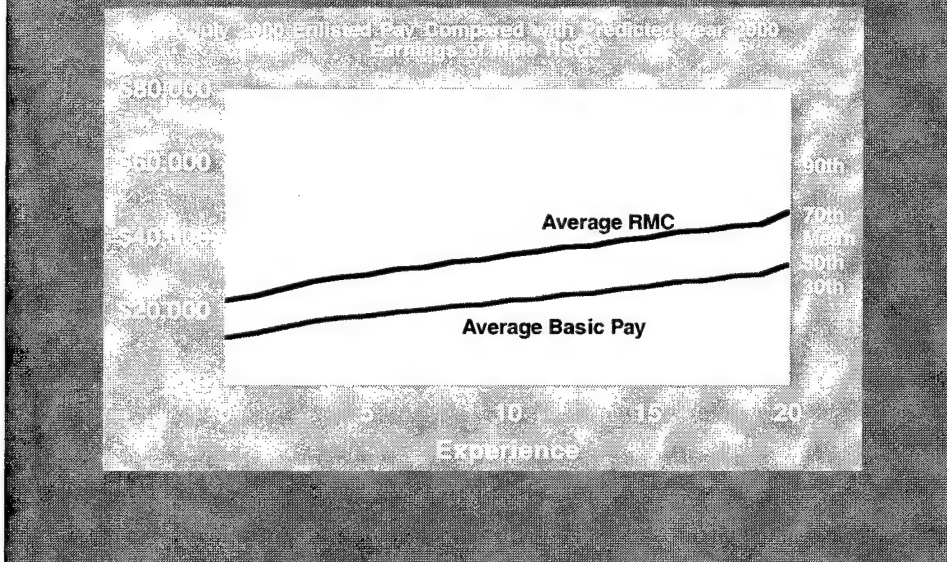
The next few charts compare military pay with the civilian pay of males. We use two measures of military pay, basic pay and regular military compensation (RMC). RMC equals basic pay plus the basic allowance for housing (BAH), the allowance for subsistence (BAS), and an adjustment for the nontaxability of the allowances. There are three pay comparisons: military pay in July 2000 vs. civilian pay of high school graduates; military pay in July 2000 vs. civilian pay of those with some college; and military pay in 2005 vs. civilian pay of those with some college.

We construct civilian earnings profiles from the 1994-1999 March Current Population Surveys (CPS). Since the March CPS of each year asks about earnings in the previous calendar year, earnings are actually for years 1993-1998. Earnings were estimated by regression analysis, and the estimated regression models were used to predict earnings. The sample included 18- to 59-year-old males who worked at least 30 weeks and averaged at least 35 hours per week. The regressions controlled for experience, race, marital status, occupation, size of employer, and several other factors. Because the racial mix in the CPS varied with experience and was not fully representative of the racial mix of today's youth population, earnings were forecast by race and weighted to reflect the racial mix in today's 17- to 21-year-old population.

The following charts show the predicted earnings at the 30th, 50th, 70th, and 90th percentiles of earnings. At the 50th percentile (or median), half the workers earned more and half earned less, and similarly for the other percentiles (i.e., at the 90th percentile, 10 percent earned more and 90 percent earned less). In addition, a line for the mean, or average, wage is included. The mean happens to be close to the 60th percentile, so the latter has been omitted.

The wage profiles are based on a regression analysis of earnings in years 1993–1998. Annual average wage growth was estimated in the analysis and used to adjust the forecasts to year 2000 dollars. The Appendix explains the regression analysis and forecasts of earnings profiles in more detail.

FY 00 Enlisted RMC Compares Favorably with Earnings of High-School Graduates



This slide compares July 2000 RMC and July 2000 basic pay by years of service with predicted earnings of male high school graduates.

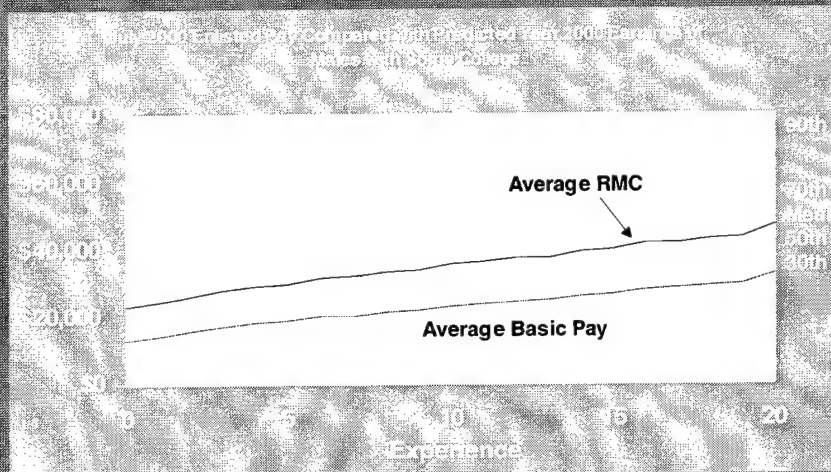
Early on, RMC lies between the 80th and 90th percentiles, but this probably exaggerates the level of military compensation. The average BAH for a first-term enlisted person is over \$500 per month (\$6,000 per year), based on local area housing costs. But many junior personnel are single and live in government quarters; these personnel often do not have the option of taking the allowance, which many would do if given the choice. Single Navy personnel surely do not value a bunk on a ship at the current level of BAH. For junior personnel, effective RMC lies somewhere between the RMC and basic pay lines, probably closer to the latter.

Average RMC tracks the 70th percentile of civilian earnings from the 8th to the 20th year of service, while average basic pay tracks the 30th percentile. This difference occurs because nearly 40 percent of RMC comes from the allowances for food and housing and their tax advantage.

Although not shown, average RMC rises rapidly beyond the 20th year of service because of the changing composition of personnel. Mid-ranking enlisted personnel tend to retire around the 20th year, while higher-ranking personnel tend to stay. After the 20th year of service (YOS 20), the enlisted force comprises mostly E-8s and E-9s, the top two enlisted grades; after YOS 26, it is almost exclusively E-9s. E-9 RMC approximately equals

the 90th percentile of civilian high school graduate earnings. The 1 percent of recruits who successfully compete their way up the ranks to E-9 earn about the same as the top 10 percent of high school graduates of similar age.

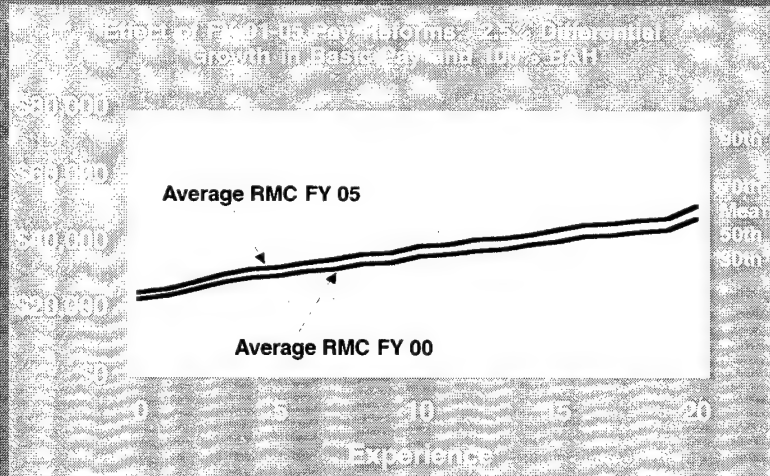
RMC Compares Less Favorably with Earnings of Those with Some College



The pay comparison for males with some college is much less favorable than the comparison for high school graduates. Mid-career RMC tracks just above median earnings, well below the 70th percentile in the high school graduate case. E-9 RMC now equals only about the 80th percentile for those with some college, not the 90th percentile.

These comparisons cannot answer the question of whether enlisted pay is adequate. Pay adequacy depends on whether pay can attract and retain personnel with the skills and aptitudes required by the services, and later we discuss recent recruiting and retention outcomes. We recognize that cyclical factors—in particular, the economic boom—have made recruiting and retention harder for the services. But long-term trends in returns to college, college enrollments, and higher education among enlisted personnel should not be overlooked. The military is more than ever competing with higher education for high-quality youth. And as enlisted personnel increase their education while in service, their opportunity wage rises. Increasingly, the comparison group for enlisted personnel is shifting from high school graduates to those with some college. An RMC that compares with the 70th percentile of civilian earnings of high school graduates compares with the 50th percentile for those with some college.

Relative to Civilians with Some College, Enlisted Pay Growth Is Slower in Mid-Career Even with FY 01–FY 05 Reforms



The FY 00 pay package provides for basic pay increases 0.5 percentage point higher than the Employment Cost Index in the next few years. This chart shows RMC given 2.5 percent growth of basic pay relative to the ECI over the period FY 01–FY 05, and a 20 percent increase in the BAH from 80 percent to 100 percent of out-of-pocket housing costs. The chart assumes civilian earnings grow at the ECI (and CPI) rate over the 2001–2005 period. The percentage increases in RMC vary by year of service, but the average increase is around 7 percent. This lifts the average RMC line to about the average civilian wage for 10 to 20 years of experience. (The average wage approximately equals the 60th percentile of civilian wages.)

Constructing Civilian Earnings Profiles with Life-Cycle Approach

- Estimate model of wage trend by age, education, occupation, and unemployment rate for each sex/race-ethnic group
- Construct earnings profiles from estimated models for cohorts aged 19 in 1983, 1998, and 2006
- Compare civilian and military career earnings
- Military pay based on:
 - Actual military pay to 2000, legislated pay increases to 2006, and ECI thereafter
 - Typical career progression using 1996-1999 promotion pace

The previous pay comparisons were snapshots at a point in time; we now shift to life-cycle comparisons. We make comparisons for several cohorts of youth: 19-year-olds in 1983, 1998, and 2006. If we looked only at a single cohort, we might find military/civilian pay differences, but we would not know whether those differences have widened or shrunk over time. The life-cycle comparisons confirm that the ratio of military to civilian pay over a career is lower for persons with some college than for high school graduates. Further, given some college, this disparity differs by occupational area: It is worse for professional/technical occupations than for production/craft occupations. Less expected, however, is the finding that the present value of earnings in an enlisted career has been *rising* relative to that of civilian careers of those with some college. If career earnings alone determined career choice and retention, recruiting and retention should be better today than they were in the past, contrary to actual recent outcomes.

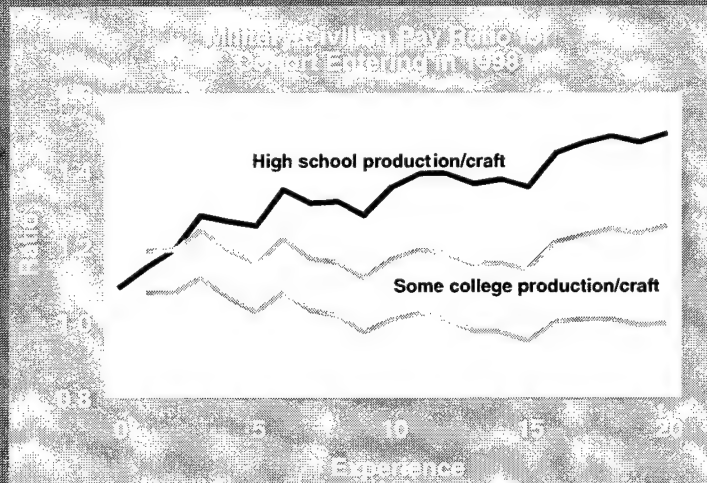
This leads us to consider the return to four or more years of college—not just the return to some college—as a factor in choosing a civilian education and career track over a military career. It also suggests the importance of military vs. civilian career content (skill development, experiences, opportunity for advancement) and transferability of skill as other possible factors in the military's competition for high-quality personnel.

The life-cycle analysis draws on a study by Hosek and Sharp (2001), who used the March Current Population Surveys to develop life-cycle civilian earnings profiles by cohort. Wage data for 1983–1998 were grouped by age, education, occupation, race/ethnicity, and gender. The average wage for each group, deflated to 1998 dollars, was regressed on age/education/occupation indicators, a time trend for each education/occupation group, and an unemployment effect differing by age and education. Separate models were estimated for each race/ethnicity-gender group. The data and models were then used to construct 20-year age-earnings profiles for three cohorts, persons age 19 in 1983, 1998, and 2006, respectively. This was done for each race/ethnicity-gender group, and within group by each combination of education level and occupation.

Earnings for the 1983 cohort were based on actual wages for 1983–1998 and predicted wages for 1999–2003, while earnings for the 1998 and 2006 cohorts were based on predicted wages. The wage predictions used the Congressional Budget Office forecast of unemployment rate for future years.

Military pay profiles assume a career having promotion rates equal to those in 1996–1998. The measures of military pay were taken from the Uniformed Services Almanac, which provides Basic Military Compensation (BMC) to 1997 and RMC for 1998 onward. BMC includes basic pay, basic allowance for subsistence, basic allowance for quarters, and an adjustment for the nontaxability of BAS and BAQ. RMC is the same except that BAQ is replaced by BAH, which restructures the housing allowance and includes amounts to adjust for location-specific differences in the cost of housing. Such adjustments had previously been in a separate allowance, the variable housing allowance. Military pay includes the 4.8 percent basic pay increase effective January 2000, the structural increases effective July 2000, and the ECI + 0.5 percent increases in years 2001–2006. ECI forecasts were generated by Data Resources, Inc., and provided to RAND by the Office of Compensation in the Office of the Secretary of Defense. Future military pay was converted to 1998 dollars by a deflator based on a Congressional Budget Office forecast of CPI growth. The analysis adjusted for the upward bias in the CPI by subtracting 1.1 percentage points per year, following the suggestion of the Boskin Commission. (The analysis alternatively used the Bureau of Labor Statistics CPI research series, which also adjusts for bias, and obtained basically the same results.) The CPI bias comes from substitution bias (as the price of a good rises, consumers respond by choosing substitute goods whose prices have not risen), outlet bias (CPI did not allow for the emergence of discount outlets offering the same goods at lower prices), and quality bias (a good of the same apparent description increases in quality).

Military/Civilian Pay Lower, Flatter for Growing Fraction of Enlisted Personnel

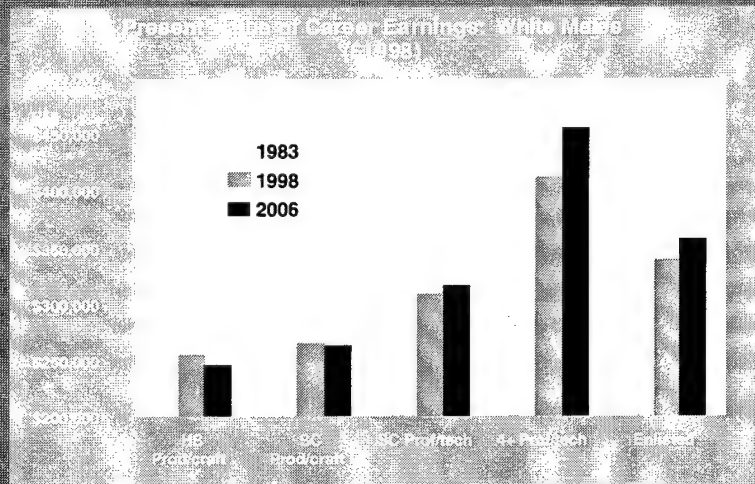


This chart displays the military/civilian pay ratio for the 1998 cohort by year of experience. In the top line, pay over a military career is compared with the average pay of a high school graduate working in a production/craft occupation. The military/civilian pay ratio begins at 1.1 and rises above 1.5 by 20 years of experience. This relative rise differs from the cross-section results, which showed RMC tracking the 70th percentile over years of service 8 to 20 and hence having a constant ratio over that range. The rise in the life-cycle comparison shown above occurs because real earnings of high school graduates in production/craft occupations are predicted to decline in the future, whereas real military earnings are expected to rise.

The middle and lower lines compare military pay with the average pay of workers with some college in a production/craft occupation or a professional/technical occupation, respectively. The production/craft pay ratio starts near 1.2, declines toward 1.1, then rises to over 1.2. The professional or technical pay ratio is lower overall because of the higher civilian wages in these occupations. The ratio starts below 1.1, declines toward 0.9, then rises to 1.0. The some-college career pay ratios are in effect similar to the cross-section comparison, which showed RMC tracking just above the 50th percentile over YOS 8 to 20. The pay ratios above are fairly flat, which implies that RMC and civilian pay will grow at about the same rate over these years of experience.

For an enlistee entering with a high school education, military pay compares well with civilian pay, and an enlisted career holds the promise of significant growth in relative pay. But for an enlistee who acquires some college while in service, relative pay declines once the additional education is obtained (compare the top line with the middle or lower line), and then there is virtually no prospect of relative pay growth over the remainder of the career. Indeed, the drop in relative pay is greater for personnel in professional or technical occupations, and the prospects for relative pay growth over the career are worse. We therefore infer the same message we obtained from the cross-section results, though the life-cycle results indicate that the effect differs by occupational area.

Despite Rising Value of Enlisted Career, Attracting Those with Some College May Prove Difficult



The chart displays the present values of 20-year careers for different cohorts. The present value calculations use a 10 percent real personal discount rate. (Warner and Pleeter [2001] find evidence of even higher personal discount rates among military personnel, above 20 percent.) The perspective of the comparisons is that of a high school graduate interested in the payoffs to different education levels and career tracks.

The present value (PV) of an enlisted career has risen considerably from 1983 to 1998, and the full implementation of the FY 00 pay increases will increase it even further. In contrast, the PV of a high school production/craft career has fallen, reflecting the gradual erosion of real earnings of high school graduates. The military has always had to pay a premium to get and keep the people it requires, and in 1983, the PV of an enlisted career was greater than that of a high school career. Over time, the difference in values has widened. Nevertheless, in recent years, the military has had increasing difficulty recruiting high-quality personnel. We think this is the result not only of cyclical factors but also of the shift toward higher education.

The PV of a production/craft career for persons with some college is higher than that for high school graduates, but the difference is not large. Also, the value of this career has been about constant. The value of a professional/technical career for those with some college is higher than

that of a production/craft career for high school graduates and has been rising. For the 2006 cohort, a professional/technical career for those with some college is predicted to be worth about \$70,000 more than a production/craft career for those with high school only (\$317,000 vs. \$247,000).

The value of careers based on four or more years of college has been rising fastest, especially in professional/technical fields. This rise encourages more people to start college and to continue toward a four-year degree after a year or two of college. That is, the returns to four years of college will be on the minds of some people who were initially oriented toward community college. Similarly, service members who have obtained some college while in service may be increasingly drawn to complete four years and cash in on a high-paying private-sector job. The military's educational benefits help to facilitate this behavior.

Indeed, college enrollment for persons in their mid- and late 20s has been rising, leading to an increase in the percentage of persons in their early 30s with four or more years of college. Thus, the PVs suggest that the military's competition with higher education comes in part through the rising returns to professional/technical occupations and the role of a year or two of college as a stepping stone to four or more years of college.

Still, many people interested in some college may not be interested in four or more years of it. They may be concerned with the value of civilian job experience vs. military experience, and it may be that civilian job experience has become relatively more valuable than it has been in the past.

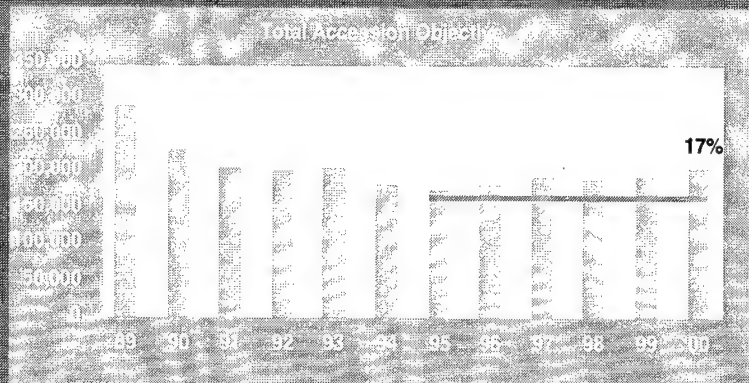
Trends for College-Educated Workers Will Continue to Be Relevant for Military

- Rising return to college education is a long-term trend
- Studies indicate that skill-biased technological change (e.g., computers) explains a large part of recent wage growth for college group
- Recent technological changes are not a temporary phenomenon, though pace and impact on economy will change over time
- Military requirements for high-quality personnel and those with technical skills are not likely to abate in the future and are likely to increase

In seeking an explanation for the wage growth for those with a college degree, the economics literature points to technological change that is favoring the most skilled and educated workers. In other words, computers have made more-educated workers relatively more productive. This phenomenon is not likely to abate but will continue in some form as additional technological change occurs in the computer industry, which in turn has an impact on the rest of the economy.

Furthermore, the military will continue to demand skilled and educated personnel, and it will need to continue to draw from the civilian labor market to get these personnel and retain them. Therefore, these trends will continue to be relevant to the military, even without a booming economy.

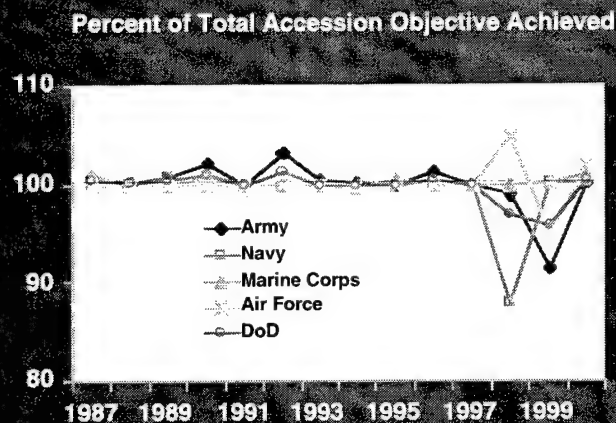
Annual Military Recruiting Requirement Has Increased Since Mid-'90s



We next examine broad measures of active-duty recruiting and retention success. The measures provide an indication of how well the services have been able to meet their personnel needs in recent years. We present a preliminary assessment of what effect the FY 00 pay action might have on recruiting and retention, and we indicate the potential impact on the services of a continuation of recent retention rates in the future, in the absence of the FY 00 pay action.

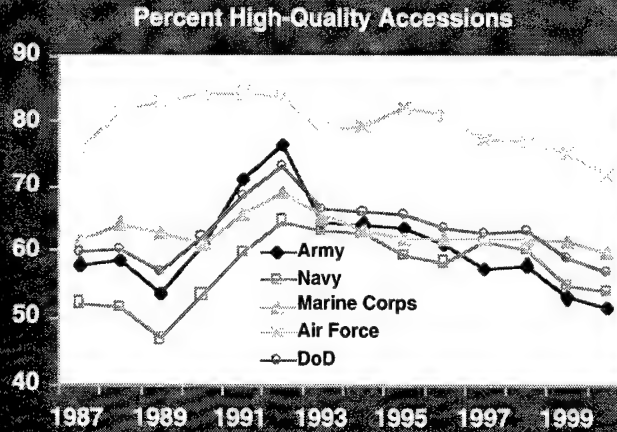
In considering recent recruiting outcomes, it is useful to examine how the military's overall recruiting requirement has changed over time. Following a steep drop in the requirement during the defense drawdown of the early 1990s, the overall requirement has been rising since the mid-1990s. Specifically, since 1995, the overall accession mission has increased by 17 percent across the DoD.

Meeting Recruiting Requirements Remains Difficult for Air Force and Army



The services struggled to meet their accession targets in 1998 and 1999. In FY 00, all services met their goals.

Recruit Quality Has Declined in All Services Since Its Peak in 1992



A key indicator of recruiting success is the percentage of recruits who are of high quality. High-quality recruits are defined as those with a high school diploma who score in the upper half of the AFQT score distribution.

The percentage of recruits who are of high quality reached a peak in 1992, during the recession and the drawdown, and then fell steadily. At the end of the 1990s, quality stood at the level seen at the end of the 1980s. DoD-wide, 57 percent of the accessions were of high quality in FY 00. The figures by service were: Army, 51.5 percent; Navy, 54.2 percent; Marine Corps, 59.9 percent; and Air Force, 71.8 percent. Compared with the situation in the late 1970s and early 1980s, quality is high, but a continuation of the downward trend would be worrisome.

Since high-quality personnel perform better, and the quality of an entering cohort of recruits does not change much as it progresses in service, there is good reason not to allow quality to drop further. Further, it is possible that the demand for high-quality recruits relative to total recruits is rising. If that is the case, although the drawdown cut personnel strength and accession requirements by one-third, it is questionable whether the demand for high-quality recruits should have been cut by one-third, as recent recruiting performance suggests.

Economic Boom, Rising College Enrollment Made Recruiting Much Harder

	<u>Pct change 1992-1999</u>	<u>x</u>	<u>Effect on HQ recruits*</u>	<u>=</u>	<u>Pct change in HQ recruits</u>
Military/civilian pay	-6		1		6
Unemployment rate	-38		-3		-11
College enrollment**	7		-8		-6
					-23

As a result,

* Warner, Simon, Payne (2001).

** Change between 1993 and 1997.

The economic boom and increased college enrollments were hard on recruiting in the 1990s. Between FY 92 and FY 99, the military/civilian pay ratio for 18- to 24-year-olds fell by 6 percent, and the national unemployment rate fell by 38 percent. We have used estimates from a recent recruiting study (Warner, Simon, and Payne, 2001) to estimate the change in the number of high-quality recruits due to pay, unemployment, and college enrollment. The estimates in the chart hold other factors constant, e.g., changes in recruiting resources such as recruiters and advertising. The changes between 1992 and 1999 in the military/civilian pay ratio, the unemployment rate, and college enrollment imply a 23 percent drop in high-quality recruits. Changes in recruiting resources, not shown, could counteract this drop.

Negative Impact on High-Quality Accessions Has Been Large

Actual outcomes	1992	1999
Accession objective	203,000	195,000
Actual accessions	203,000	187,000
Percent high-quality	74.4%	59.1%
Number high-quality	151,000	111,000

Estimated effect of pay, unemployment, college

*A 23% decline in high-quality accessions
from 1992 equals $.23 \times 151,000 = 35,000$.*

To put the predicted 23 percent drop into perspective, we compared recruiting in FY 92 with that in FY 99. The DoD accession objective was 200,000 in FY 92 and 195,000 in FY 99. In FY 92, 203,000 were recruited, of whom 74.4 percent or 151,000, were high-quality recruits. A 23 percent decline against that base equals 35,000, hence a prediction of $151,000 - 35,000 = 116,000$ high-quality recruits.

In FY 99, the DoD fell 8,000 short of its accession objective, recruiting 187,000. Of these, 59.1 percent, or 111,000, were of high quality.

The numbers indicate that declining pay, declining unemployment, and rising college enrollment played a large role in the decline in the number of high-quality recruits. The situation is more complex than the chart indicates, because the services took countermeasures against these changes and worked harder to achieve their recruiting targets. Despite these efforts, the net result of 111,000 high-quality recruits is close to the simple prediction of 116,000 based on pay, unemployment, and enrollment. Therefore, either the combined effect of pay, unemployment, and enrollment was worse than the predicted 23 percent drop, or other, unobserved factors were at play.

FY 2000 Pay Actions, Slower Economy Will Restore Part of Recruiting Loss in 1990s

<u>CBO Outlook</u>	<u>Pct change 1999-2006</u>	<u>Effect on HQ recruits*</u>	<u>Pct change in HQ recruits</u>
Military/civilian pay**	9 - 19	1	5 - 19
Unemployment rate	16	-.3	5
College enrollment***	6	-.8	5
			9 - 19

* Warner, Simon, Payne 1999.

**Assumes no further downward trend in HS wages.

***Assumes same change as 92-99.

The improvement in military pay resulting from the FY 00 pay legislation and an anticipated softening of the economy should ease the recruiting situation. However, college enrollment will likely continue to increase.

We consider a range of possible changes in the military/civilian pay ratio itself. The range reflects alternative forecasts about how civilian pay will change in the future. The upper-bound forecast is based on a linear extrapolation of the trend in the earnings of 17- to 26-year-old males who have a high school diploma. The real earnings of this group have been declining or are at best nearly flat. This means their nominal earnings are not expected to grow as fast as the CPI. The FY 2000 pay legislation, however, will cause military pay to rise faster than the Employment Cost Index for six years, and based on the outlook, military pay will grow faster than inflation. As a result, the military/civilian pay ratio is expected to rise. Assuming the civilian pay trend continues, we forecast a 19 percent increase in military/civilian pay by 2006 relative to 1999.

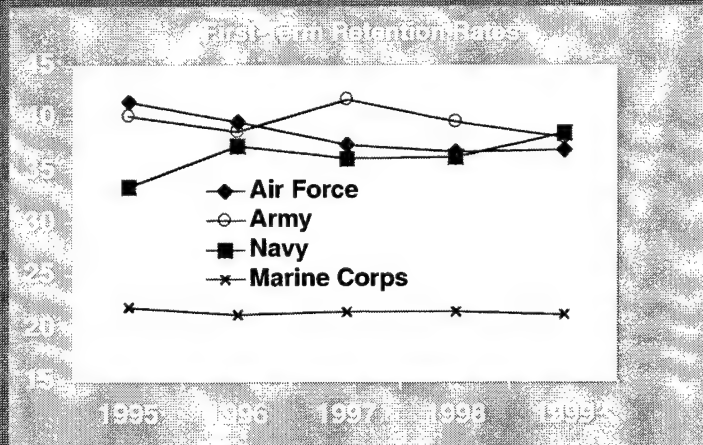
Frankly, this forecast seems high to us. Changes in the economy might cause earnings of high school graduates to rise rather than decline. For instance, low-skill labor markets have been fed by immigration and, more recently, by welfare reform, and perhaps these trends will abate. Further, the predicted increase in inflation might be too low; a higher inflation rate

would mean slower growth in real military pay. To account for this possibility, we also consider a smaller increase, i.e., 9 percent in military/civilian pay between 2000 and 2006. (It is also possible that high-quality youth may become less responsive to the military/civilian pay ratio for reasons having to do with the perceived value of civilian education and job experience.)

In FY 1999, 59 percent of recruits were of high quality. A 9 percent increase would raise the level to 64 percent in 2006, while a 19 percent increase would raise it to 70 percent. The quality percentages would be lower in intervening years. A level of 64 percent is above the range of recruit quality in the late 1980s, and 70 percent is in the range of the early 1990s.

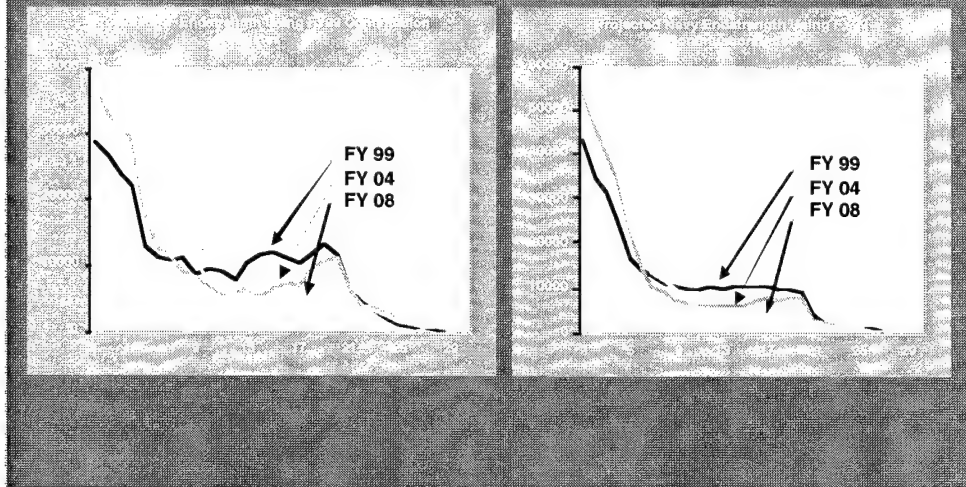
The gradual increase in military pay called for by the FY 2000 legislation means that the percentage of recruits who are of high quality could remain relatively low for several more years.

First-Term Reenlistment Rates Have Been Falling in the Army and Air Force



Turning to retention, the next few charts examine recent trends in retention and show projections of how retention and the experience mix of the services might change in the future. This chart shows the trend in the first-term retention rate, by service, defined as the percentage of personnel who, having reached the expiration date of a term of service, were still in service a year later (data provided by the Defense Manpower Data Center). Among the services, the Air Force experienced the largest retention-rate decline between 1995 and 1999, as retention fell by 5 percentage points, or 12 percent. The rate for the Marine Corps was relatively flat, but the Army's first-term retention rate fell by 2 percentage points, or 5 percent. The Navy rate actually increased, but the increase might reflect the Navy's rising first-term attrition rate, which cleared away personnel who would not have reenlisted.

FY 99 Continuation Rates Would Cause Large Drops in Air Force, Navy Mid-Career Forces, Big Increases in Recruiting Requirements

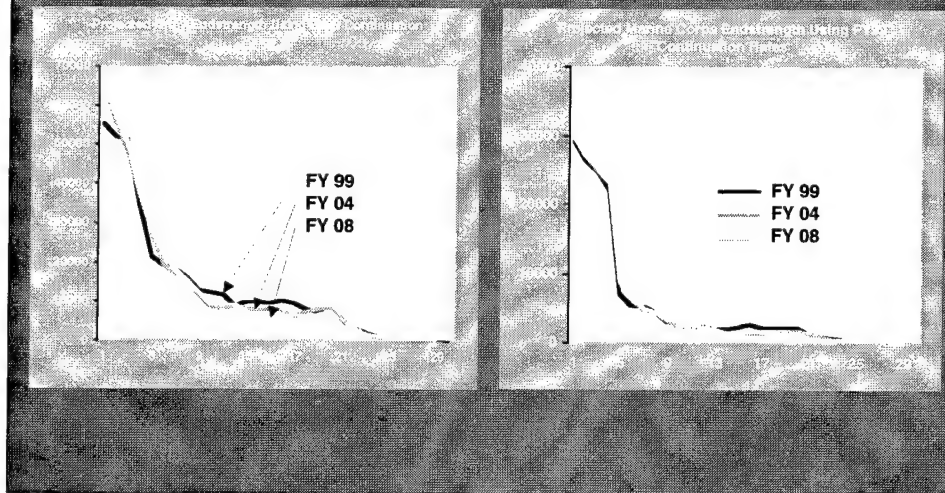


The next two charts show the projected experience mix of each service under the relatively low continuation rates observed in FY 99, before the FY 00 pay action. The changes in the experience mix suggest what might happen if military vs. civilian pay and other factors remained at their FY 99 levels. To compute the experience profiles and project them into the future, specifically to FY 04 and FY 08, we began with the inventory of personnel by YOS and applied the FY 99 continuation rates by YOS. Total endstrength is maintained in each service by increasing accessions in YOS 1. When continuation rates are low relative to earlier years, the number of experienced personnel will fall, and the number of junior personnel will rise as accessions increase to make up the shortfall in endstrength.

This chart shows the results for the Air Force and the Navy. The FY 99 continuation rates are clearly low enough to cause mid-career forces to fall precipitously, especially in the Air Force, and the forces are projected to become far more junior as accessions rise.

The FY 99 rates, of course, do not reflect the effects on retention of the FY 00 pay action. An improvement in retention rates would avert the projected loss of seniority shown here for the Air Force and the Navy.

Some Potential Problems Also in Army, But Not in Marine Corps if FY 99 Rates Continue



The projections for the Army show some loss of seniority in the mid-career range, although the effect is not large. We project no change in the seniority mix for the Marine Corps, which implies that the FY 99 continuation rates are at their steady-state level. Consequently, any improvement in retention due to the FY 00 pay action will cause the Marine Corps to become a more senior force, unless it takes steps to prevent this outcome, say, by using tighter reenlistment controls.

Available Information Suggests Mixed Aggregate Enlisted Retention Picture in FY 00

- Compared to FY 99, first-term FY 00 reenlistment rates were higher
- However, second-term reenlistment rates were about the same or slightly lower; career reenlistment rates were significantly lower, except for the Marine Corps
- Furthermore, the services, particularly the Air Force, missed some of their FY 00 reenlistment targets

The previous charts rely on data from FY 99 and earlier. Information for FY 00 provided by the Office of Officer and Enlisted Personnel Management in the Office of the Secretary of Defense suggests that relative to FY 99, first-term reenlistment rates improved for all services.

However, the picture is more mixed when second-term and third-term reenlistment rates are considered. Second-term reenlistment rates stayed about the same (in the case of the Navy and the Marine Corps) or were somewhat lower (in the case of the Army and the Air Force). Third-term, or career, reenlistment rates were substantially lower in the Army, Navy, and Air Force but were higher in the Marine Corps.

The picture also appears mixed when it is recognized that in many cases, the services did not meet their reenlistment rate targets in FY 00, despite an increase in some of those rates relative to FY 99. The Air Force did not meet any of its aggregate reenlistment rate targets in FY 00, despite an increase in the first-term rate. The Air Force indicates that it has begun to meet its first-term reenlistment goal in FY 01, and second-term reenlistments have also improved as of the end of March 2001. Nonetheless, as Air Force Lieutenant General Peterson, Deputy Chief of Staff, Personnel, recently testified at a hearing of the Personnel Subcommittee of the Senate Armed Forces Committee (April 24, 2001),

"While second-term reenlistments are slightly up from FY 2000, the continued shortfall in this area continues to be our most significant enlisted retention challenge."

Estimates Suggest FY 00 Pay Action Will Improve Future Retention

	<u>Pct change</u>	<u>Effect on Retention*</u>	<u>Pct change in Retention</u>
Military/civilian pay	-6	.5 to 1.5	
Unemployment rate	-38	.15	
Military/civilian pay	9 to 19	.5 to 1.5	
Unemployment rate	16	.15	

* Buddin et al. (1992) and Arkes (2001)

The extent to which recent improvements in retention are due to the FY 00 pay action are unclear. Too little time has elapsed since July 2000 to judge the impact of the legislation on recruiting and retention.

As for the expected effect in the future, we used available estimates of the effects of changes in relative military and civilian pay and in the civilian unemployment rate to make predictions of the effect of the legislation on first-term reenlistment rates. These estimates are shown in this chart, and the discussion about them is the same as for the recruiting forecast chart.

Buddin et al. (1992) estimate that for each 1 percent increase in military vs. civilian pay, first-term retention increases by 1 to 1.5 percent. But to be conservative we also consider a lower range of responsiveness to pay.

Applying the range of pay-effect estimates to the range of forecasts, we find that the predicted retention effect of the FY 00 pay action, together with the effect of a change in the unemployment rate, will range from a 7 percent to a 31 percent increase in retention between 1999 and 2006.

Between 1992 and 1999, the available range of estimates implies a 9 percent to 15 percent drop in retention due to changes in the ratio of military to civilian pay and the unemployment rate. Therefore, depending on which estimates and forecasts one uses, future retention trends will

either just offset the decline in the 1990s or more than compensate for those declines. Either way, these estimates suggest that the FY 00 pay action will go a long way toward making up for the declines of the 1990s. Furthermore, these estimates do not account for increases in reenlistment bonuses that occurred in 2000 or other actions the services may take (such as relaxation of retention control points) in the future to improve retention. Still, the estimates and forecasts apply to retention across all occupations. Therefore, shortages and retention problems in specific occupational areas may continue to be concerns in the future despite the overall improvement in retention.

That the forecasts suggest that the FY 00 pay action will significantly improve retention does not mean that an additional pay action is not necessary. As discussed earlier, the FY 00 pay action did not address the fundamental changes in the educational composition of the enlisted force and in the youth population from which the military recruits or the changes in the civilian opportunities available to enlisted personnel.

Policy Options for Adjusting Enlisted Pay

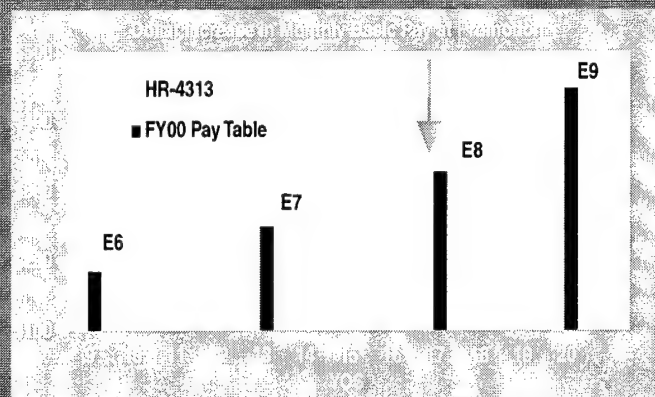
- Across-the-Board pay raise (e.g, same % increase for all enlisted personnel)
- Pay raise for mid-career enlisted personnel only
- Graduated pay raise (e.g., the % increase is higher for those in higher pay-grades)

Although our analysis was not intended to recommend specific policy initiatives, the next part of the briefing discusses the types of policies that might be considered to readjust enlisted pay to reflect the changing educational and skill composition of the enlisted force and to make an enlisted career more competitive with the civilian labor market. The discussion focuses on the broad policy issues associated with raising pay rather than on specific policy proposals and their costs and benefits.

One way to increase mid-career enlisted pay is to give an across-the-board pay raise to all enlisted personnel. An advantage of an across-the-board pay raise is that it would give the same percentage increase to everyone. This is appealing to many for reasons of equity and simplicity, including ease of communicating the pay increase to service members. However, the disadvantage of the across-the-board approach is that it would maintain the same structure of pay across grade and years of service. We showed earlier that relative to civilian pay, mid-career military wage growth is slower for personnel with some college than for those with only high school. Holding real civilian earnings constant, an across-the-board pay raise that increases pay at all experience levels by the same percentage would maintain that structure. While the level of mid-career military pay would be higher, the growth rate at that stage would be the same. Therefore, an across-the-board pay raise would not address the relatively flat structure of military pay, relative to civilian pay, for enlisted personnel.

Pay Raise Targeted Only to Mid-Career Would Create "Notches" in Pay Table

Example: House proposal to raise E5 to E7 basic pay
reduces reward to E8 promotion



A second approach is to target the pay raise to those who are in mid-career. A third approach is to give a graduated pay raise to enlisted personnel. Under this approach, all enlisted personnel would get a raise, but the percentage increase would be successively higher for those in the higher pay grades, with those in the highest pay grade (E-9s) receiving the highest percentage increase.

A pay raise specifically targeted to enlisted personnel in mid-career also has advantages and disadvantages. One advantage of this approach over the across-the-board approach is that a mid-career pay raise bolsters incentives to continue in service after obtaining some college. As we saw, many first-term personnel now obtain some college, and further, the military/civilian pay ratio is lower in mid-career years for personnel with some college than for personnel with high school only. In addition, a mid-career pay raise will generally cost less because only a subset of personnel would receive more money. Finally, a mid-career raise would address inequities associated with the July FY 00 targeted pay raise, critics of which argued that enlisted non-commissioned officers in their mid-career received lower raises than junior commissioned officers, even though the duties for NCOs have entailed more responsibility in recent years.

Both the House of Representatives and the Senate proposed legislation in FY 00 that increased pay for NCOs only. The House Bill, HR-4313,

proposed to increase the pay of NCOs (specifically E-5s, E-6s, and E-7s) by the same percentage amount as pay was increased for junior officers under the July FY 00 pay raise.

An important disadvantage of a pay raise targeted solely to mid-career personnel is that it creates undesirable notches in the pay table. That is, when pay is increased for E-7s but not for E-8s, the pay increase associated with a promotion from E-7 to E-8 is reduced. Consequently, a promotion to E-8 is worth relatively less, and the pay profile for those who achieve E-8 and E-9 is relatively flatter. This problem is illustrated in the chart, which shows the increase in monthly pay associated with enlisted promotions to E-6 through E-9 under the FY 00 pay table and under HR-4313, at specific years of service. As the chart illustrates, those promoted to E-8 receive a smaller increment in monthly pay under HR-4313 than under the current pay table.

By reducing the payoff to promotions to the senior grades, a raise targeted only to mid-career personnel reduces the relative incentive for high-quality personnel to stay in the military and seek advancement to E-8 and E-9; it also reduces the incentives for individuals in mid-career to work hard, perform effectively, and take the necessary actions that lead to a promotion to those grades. Given the military's hierarchical organizational structure, where the actions and productivity of the senior personnel affect the productivity of more-junior personnel, such adverse incentive effects could be large. Consequently, such a raise would be less effective, in terms of military productivity, than would a graduated pay raise, which is the third approach. On the other hand, because the dollar amounts under the House and Senate proposals are relatively small, the overall negative effects on incentives would be small as well.

Why a Graduated Pay Raise?

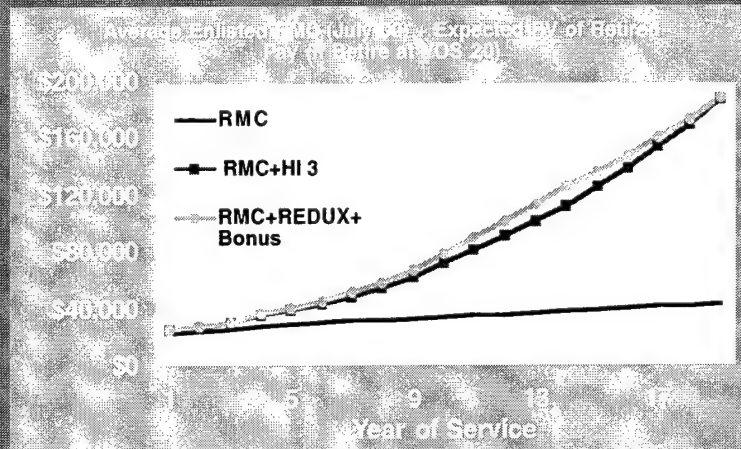
- Builds on July 2000 pay table reform
- Addresses flat structure of enlisted pay for mid-career personnel
- Increases competitiveness of military pay with the college market by increasing incentive for college-bound youth to enter and stay in service
- Motivates better performance
- Motivates high-ability personnel to stay and seek advancement

By giving increasingly higher raises to those in higher grades, a graduated pay raise would increase the wage growth for mid-career personnel relative to the civilian sector and would therefore target resources to the area where the educational and skill content of the enlisted force is the greatest and where relative pay growth has been lagging. A graduated pay raise has other advantages. Like the across-the-board pay raise, all enlisted personnel would receive a raise, although not the same percentage amount. Like a mid-career pay raise, the graduated pay raise would target resources to enlisted personnel who have the most education and whose pay growth has been lagging relative to that of males with some college in the civilian sector. Furthermore, earlier research has estimated that it is less costly to achieve a given level of retention when pay raises are graduated than it is when they are across the board (Asch and Warner, 1994b). Therefore, for a given level of retention, graduated pay raises are generally more cost effective than across-the-board raises. Furthermore, the cost savings of a graduated pay raise could be used to help defray the overall cost of the pay raise. Finally, unlike a mid-career pay raise, the graduated pay raise would give raises to those in the most senior ranks, thereby avoiding the creation of undesirable notches in the enlisted pay table.

Past research also highlights another advantage of a graduated pay raise (Asch and Warner, 1994b). For a given level of cost, such pay raises are estimated to have a larger impact on personnel productivity than across-the-board raises have. A system that graduates pay toward the middle and senior grades increases the financial returns associated with promotion. If the promotion system successfully identifies the most-productive and best-performing personnel, a graduated system increases the incentives for members to work hard and effectively, and it motivates the performers who are the most likely to get promoted to remain in the organization. In other words, a graduated system improves productivity incentives.

The July FY 00 pay raise was targeted, although it was not graduated in the sense of providing successively higher raises to those in higher grades. Rather, it gave raises that were generally larger to those in mid-career. The July FY 00 pay raise addressed several anomalies in the basic pay table. As discussed in Asch and Hosek (1999), these anomalies included longevity pay increases that were greater than promotion pay increases for some personnel and larger pay raises for early promotions than for some later promotions. The July FY 00 targeted raise addressed many of these problems and helped create a pay table that is more graduated overall. Therefore, any additional graduated pay raise in the future would build on the July FY 00 basic pay raise.

Enlisted Compensation Is Already Graduated Due to the Role of Expected Retired Pay



It is useful to note that the structure of the military compensation system is already graduated because it provides disproportionately more expected compensation to those in the more senior grades. However, most of the graduation is in the form of expected retired pay, not basic pay. The role of expected retired pay in current military compensation is shown in this chart.

The graph shows the average enlisted RMC by YOS and the expected PV at each YOS of average retirement wealth for an individual retiring at YOS 20. Expected PV is computed by multiplying the PV at a year of service by an estimate of the probability that an individual will stay in service until YOS 20, where the probability is based on FY 99 continuation rates by YOS for all services. A 10 percent real discount rate is also assumed, and average retirement wealth is computed as follows. First, retired pay is computed for personnel in all grades at YOS 20. Then the PV of retired pay from retirement age until age 100 is computed, assuming enlisted personnel retire at age 40 and assuming a standard life table to compute survival rates from age 40 to each future age. To compute average retirement wealth, a weighted average of retirement wealth is calculated using the FY 99 grade distribution at YOS 20.

Regardless of whether personnel retire under REDUX¹ (with a \$30,000 bonus paid at YOS 15 for those who retire at YOS 20) or under REDUX's predecessor, known as High-3, a large fraction of military compensation (assumed here as the sum of average enlisted RMC and expected PV of retired wealth) comes in the form of expected retired pay for those approaching retirement. The fraction increases with YOS because as individuals approach YOS 20, the PV of retirement wealth is discounted for fewer years, and the individuals have a higher probability of staying until YOS 20.

¹REDUX is the name commonly given to the retirement benefit system that took effect on August 1, 1986. Among other changes, it reduced retirement benefits from 50 percent to 40 percent of the highest three years of basic pay for those retiring at YOS 20.

Past Studies Recommend Restructuring Military Compensation

Recommendations by Defense Science Board report (1999) and RAND studies (1994, 1998) include:

- Graduated pay raises by rank (i.e., higher pay raises for mid-grade and senior personnel): to keep pay competitive and to provide performance incentives
- Retirement system reform: to vest personnel earlier in a 401K-type retirement plan that would provide an annuity for members' old age
- Greater role of separation pay: to improve force management flexibility and to facilitate the transition of personnel into "2nd career"

Several studies, including, most recently, the Defense Science Board (DSB) Task Force on Human Resource Strategy (2000), have recommended restructuring the military compensation system to reduce its cost while permitting more flexibility in personnel management and maintaining the advantages of its graduated structure. These studies have argued that the role of retired pay should be reduced and basic pay should be not only increased, but made more graduated by grade to maintain the overall graduated nature of the compensation system as a whole. Evidence on personal discount rates in the military suggests that enlisted personnel discount future benefits at a significantly higher rate than that at which the government discounts future costs (Warner and Pleeter, 2001).

Therefore, benefits that are paid earlier in the member's career are valued more than those paid later. Consequently, the government can more cost effectively meet its recruiting and retention goals by increasing the role of basic pay and reducing the role of retired pay.

These studies have also argued for making the two policy goals of the military retirement system—helping individuals accumulate for retirement after age 62 and inducing separations at desired times prior to age 62—more transparent. The DSB recommended replacing the part of the retirement system that pays personnel after age 62 with a 401K-type retirement system that would vest personnel earlier (say, at year 10 rather

than year 20) in a plan that would begin payment at age 62. It also recommended replacing the part of the system that pays personnel prior to age 62 with a system of separation pays that can be used to induce personnel to separate at desirable times in their careers and to permit more variable career lengths across occupational areas. That is, separation pay can solve the flexibility problems created by a back-loaded or graduated compensation system.

Recent Changes Have Been in the Right Direction

For example, FY 2000 legislation made these changes:

A more skewed pay table

Rewards for promotion now generally exceed rewards for seniority

A reduced role of retired pay

Most members will opt for \$30K bonus over High-3, the retirement plan with higher benefits

A 401K-type plan

Members can even contribute bonuses

Although no wholesale restructuring of the military's compensation system has been undertaken since World War II, there have been changes in the system in the past two decades that have tended to reduce the role of retired pay and to increase the role of basic pay while increasing the degree of graduation. Thus, these changes have been in the right direction. A good example is the FY 00 pay legislation. This legislation resulted in a somewhat more graduated military pay table, especially for officers. Regarding retired pay, although the legislation did not eliminate the 20-year system, and in fact offered a more generous retirement plan to those covered by REDUX, it also offered a \$30,000 bonus to be paid at YOS 15 to those who did not opt for the more generous system. An analysis of the financial consequences of choosing the bonus over the more generous retirement system indicates that for most military personnel, the bonus will result in higher expected lifetime compensation (Asch and Hosek, 1999). In other words, most military personnel would have reason to choose the bonus over the more generous retirement system. Since basic pay was increased as part of the FY 00 legislation, and many personnel will choose the bonus over the more generous retirement system, and the bonus occurs relatively early in an individual's lifetime, the net result is that the role of retired pay in lifetime compensation will be reduced. Finally, the FY 00 legislation gives military members the option to participate in a 401K-type retirement plan. This provides a retirement vehicle for those who serve fewer than 20 years, and the government will contribute to it for those who reenlist in critical specialties.

So How Can DoD Become the Employer of Choice in the New Economy?

- Pay problem needs to be addressed
- Pay actions should:
 - Increase mid-career and senior enlisted pay
 - Increase with rank
- Military recruiting and personnel management needs to be reformed to better accommodate growing importance of education among current and future enlisted personnel

Future pay actions that address the long-term structural changes in the college market that have been discussed in this briefing should continue to move the overall structure of compensation in the right direction. Such actions should continue to focus on increasing the level of basic pay, bonuses, and other forms of pay that occur early in a military career, increasing the degree of graduation of these pays, and reducing the role of retired pay. To secure the competitiveness of enlisted pay in response to the rising levels of education among military personnel, the attractive opportunities they have in the civilian sector, and the need to recruit high-quality personnel in the future, a pay raise is warranted and it should be graduated, i.e., it should provide larger pay raises to those in the middle and senior grades.

Although the focus of this briefing has been on enlisted pay and compensation, it is worthwhile to recognize that improving the competitiveness of enlisted careers with civilian opportunities will also require changes in recruiting practices and in personnel management. The services have begun to make such changes. For example, they have introduced programs such as the Navy's "tech-prep" and "CASH" programs and have expanded existing educational programs such as the tuition assistance program. Nonetheless, the services must continue to examine how they can improve their effectiveness in recruiting the college

market, how they can enhance military career opportunities for enlisted personnel with some college, and how they can help a better-educated enlisted force transition smoothly into the civilian labor market when they leave the military. Such changes, together with changes in pay, will help position the services better in the civilian labor market and will improve their ability to meet their current and future personnel needs.

Appendix A

PREDICTING YEAR 2000 CIVILIAN EARNINGS FOR THE CROSS SECTIONAL APPROACH

Data from the March 1994–1999 Current Population Surveys were used to develop profiles of civilian earnings for comparison with military earnings profiles. To develop civilian profiles, data were extracted from these surveys on all males between the ages of 18 and 59 who worked at least 30 weeks in the preceding year and averaged more than 35 hours of work per week. Self-employed workers were deleted. The dataset contained observations on 111,141 individuals.

One way to develop experience-earnings profiles from such data is to simply array the observations for each education group by age or experience level (experience = age – years of education – 6) and compute the mean earnings at each experience level and the percentile limits of earnings (30th, 50th, etc.). Such a procedure would yield noisy profiles because even in a survey as large as the CPS there are small cell sizes in some education/experience cells. Average earnings and percentile limits in these small cells will exhibit more random variation than cells containing larger samples. Smoother experience-earnings profiles can be obtained by estimating regression models for earnings by education level and using the regression models to predict earnings. The regression approach also allows us to control for observable characteristics such as race and to predict earnings for specific groups.

Theory. Let earnings = $Y = \exp\{X\beta + u\}$, where X is the set of observable determinants of Y , and u is the random error and is distributed $N(0, \sigma^2)$. Our goal is to estimate β and use the estimated equation to predict earnings. The equation is easily estimated by taking the natural logarithm of Y and estimating the equation $\ln Y = X\beta + u$. Let b equal the estimate of β , s equal the estimate of σ (standard deviation of the unobservable determinants of Y), and e equal the estimate of the random error u ($e = Y - Xb$). Predicted mean earnings at experience level t are estimated as the average value of $\exp\{Xb + 0.5s^2\}$ for individuals at experience level t . To estimate percentile limits of earnings, we sorted the estimated residuals in ascending order so that e_p equals the p th percentile residual. Then we predicted earnings at the p th percentile of earnings at experience level t as equal to the average value of $Y_p = \exp(Xb + e_p)$ for individuals with experience level t .

Empirical Model Specification. In the empirical model, $\ln Y$ was the natural logarithm of annual wage and salary earnings in the year prior to the March CPS survey. Thus, for individuals surveyed in the March 1999 CPS, $\ln Y$ is the natural logarithm of 1998 wage and salary earnings. Explanatory variables included experience, experience splines, variables for race (white, black, Hispanic), marital status, class of worker (private sector, federal employee), employer size, area type (urban, suburban), Census division, weeks of work, and calendar year.

Estimates. The estimated models are provided in Table A.1, along with associated T-statistics. A T-statistic larger than 1.96 (in absolute value) indicates that the estimate is statistically significant at the 5 percent level. Estimates may be interpreted as the proportionate change in earnings due to a given factor.

Earnings grow with experience but at a diminishing rate. Whites earn more than others. Married individuals earn more than single individuals. At all education levels, private sector workers earn more than state or local government workers; the difference is largest at the college graduate level. Federal government workers also earn more than state or local government workers.

It is important to note that earnings rise with organization size. Workers in the largest organizations (over 1,000 employees) are estimated to earn about 30 percent more than employees in the smallest organizations (less than 10 employees). When other factors are the same, workers in the largest organizations earn about 6 percent more than workers in the "average" organization.

Predicting 2000 Civilian Earnings. The regression models were used to predict the earnings of each individual in the CPS and the percentiles of earnings based on individual characteristics and experience level. The predictions thus take account of the distributions of individual characteristics in the civilian population (e.g., marital status, size of organization, area type, and Census division).

Three adjustments were made when we used the regression models to predict year 2000 earnings. First, the number of weeks of work was fixed at 52, which was the median weeks of work of the males in the CPS and represents a full work year. Second, it was assumed that earnings were derived in 1998, the most recent year of March CPS data. Third, earnings were then increased by 7.1 percent to convert them to year 2000 earnings.

Table A.1

Earnings Regressions Used to Predict Year 2000 Civilian Earnings
(dependent variable = natural logarithm of annual wage and salary earnings)

Variable	High School Graduates		Persons with Some College		College Graduates	
	Estimate	T-Stat	Estimate	T-Stat	Estimate	T-Stat
Intercept	7.622	157.85	7.511	134.55	7.503	87.83
Experience	0.056	5.02	0.058	4.71	0.087	5.26
Experience splines:						
Exp ≥ 3 years	-0.014	-0.88	0.002	0.12	-0.029	-1.31
Exp ≥ 6 years	-0.005	-0.48	-0.011	-0.90	-0.017	-1.27
Exp ≥ 9 years	-0.009	-0.92	-0.030	-2.84	-0.017	-1.47
Exp ≥ 12 years	-0.025	-2.83	0.002	0.19	-0.004	-0.36
Exp ≥ 15 years	0.019	2.22	-0.008	-0.80	-0.014	-1.19
Exp ≥ 18 years	-0.013	-1.52	-0.003	-0.36	-0.002	-0.16
Exp ≥ 21 years	-0.005	-0.58	-0.007	-0.73	-0.003	-0.24
Exp ≥ 24 years	0.005	0.53	0.003	0.34	0.012	0.94
Exp ≥ 27 years	-0.010	-1.02	-0.001	-0.08	-0.025	-1.76
Exp ≥ 30 years	0.007	0.52	-0.014	-0.96	0.013	0.62
Exp ≥ 33 years	0.003	0.16	0.006	0.33	-0.005	-0.18
Exp ≥ 36 years	-0.013	-1.29	0.006	0.41	0.010	0.35
Race (omitted = other):						
White	0.122	9.42	0.113	8.26	0.144	9.44
Black	-0.036	-2.40	-0.001	-0.08	-0.011	-0.53
Hispanic	-0.040	-2.84	0.000	0.02	-0.012	-0.57
Marital status (omitted = single)						
Married	0.184	25.79	0.177	21.88	0.151	15.27
Divorced	0.088	8.71	0.072	6.33	0.045	2.76
Widowed or separated	0.059	1.66	0.001	0.01	0.068	1.03
Class of worker (omitted = state or local):						
Private	0.089	8.82	0.085	7.66	0.215	17.51
Federal	0.084	5.29	0.059	4.04	0.172	9.85
Number of employees in organization (omitted = < 10):						
10-24	0.084	8.63	0.096	7.81	0.087	4.90
25-99	0.148	16.54	0.157	14.45	0.172	11.10
100-499	0.193	21.41	0.202	18.69	0.227	15.03
500-499	0.234	20.39	0.220	16.43	0.271	15.00
1000+	0.293	35.76	0.270	27.81	0.302	22.08

Table A.1 (continued)

Variable	High School Graduates		Persons with Some College		College Graduates	
	Estimate	T-Stat	Estimate	T-Stat	Estimate	T-Stat
Area type (omitted = rural):						
Central city	0.032	4.73	0.065	8.75	0.088	9.13
Suburb	0.097	18.06	0.113	18.61	0.138	17.27
Census division (omitted = West):						
Northeast	-0.026	-2.33	-0.031	-2.50	-0.035	-2.32
Middle Atlantic	-0.018	-1.89	-0.024	-2.37	0.005	0.40
East North Central	-0.032	-3.39	-0.043	-4.43	-0.036	-2.84
West North Central	-0.118	-10.70	-0.128	-11.34	-0.163	-11.15
South Atlantic	-0.123	-12.69	-0.098	-10.00	-0.064	-5.10
East South Central	-0.154	-12.34	-0.148	-10.65	-0.113	-5.90
West South Central	-0.146	-13.84	-0.144	-13.13	-0.101	-6.98
Mountain	-0.093	-8.94	-0.118	-11.57	-0.121	-8.56
Weeks worked	0.027	40.97	0.030	36.22	0.029	23.38
Year (omitted = 1998):						
1993	-0.140	-17.96	-0.149	-17.07	-0.175	-15.62
1994	-0.113	-14.47	-0.118	-13.54	-0.161	-14.52
1995	-0.091	-11.33	-0.100	-11.16	-0.134	-11.74
1996	-0.062	-7.71	-0.067	-7.48	-0.129	-11.28
1997	-0.031	-3.86	-0.029	-3.23	-0.065	-5.76
Industry (omitted = agriculture):						
Mining	0.310	12.45	0.310	10.19	0.225	4.77
Construction	0.170	8.95	0.167	7.62	0.039	1.07
Manufacturing	0.107	5.81	0.135	6.47	0.028	0.83
Commerce	0.204	10.77	0.185	8.68	0.028	0.81
Trade	-0.004	-0.22	-0.015	-0.69	-0.124	-3.67
Finance	0.079	3.39	0.124	5.25	0.042	1.21
Service sector	-0.011	-0.56	-0.016	-0.74	-0.094	-2.83
Public admin.	0.270	12.14	0.270	11.69	0.049	1.40
Occupation (omitted = laborer):						
Manager	0.376	31.22	0.380	25.17	0.613	17.82
Professional	0.335	18.30	0.356	21.60	0.514	14.85
Technical	0.295	16.07	0.277	16.17	0.424	11.39
Sales	0.288	23.99	0.303	19.39	0.542	15.51
Administrative	0.093	7.38	0.073	4.53	0.195	5.37
Service	-0.021	-1.81	0.076	4.63	0.297	7.85
Craft	0.213	22.44	0.223	15.54	0.250	6.88
Operative	0.104	9.58	0.088	5.21	0.056	1.32
Transport operative	0.141	13.12	0.097	5.75	0.088	2.04
Sample size	37857		31359		22264	
Standard error	0.441		0.451		0.486	
R-square	0.348		0.351		0.319	

REFERENCES

- Asch, Beth J., and James R. Hosek, *Military Compensation: Trends and Policy Options*, Santa Monica, CA: RAND, DB-273-OSD, 1999.
- Asch, Beth J., Richard Johnson, and John T. Warner, *Reforming The Military Retirement System*, Santa Monica, CA: RAND, MR-748-OSD, 1998.
- Asch, Beth J., and John T. Warner, *A Policy Analysis of Alternative Military Retirement Systems*, Santa Monica, CA: RAND, MR-465-OSD, 1994a.
- Asch, Beth J., and John T. Warner, "Should the Military Retirement System be Reformed?" in *Professionals on the Front Line: Two Decades of the All-Volunteer Force*, J. Eric Fredland, Curtis Gilroy, Roger D. Little, and W. S. Sellman (eds.), 1996, pp. 175-206.
- Asch, Beth J., and John T. Warner, *A Theory of Military Compensation and Personnel Policy*, Santa Monica, CA: RAND, MR-439-OSD, 1994b.
- Buddin, Richard, Daniel Levy, Janet Hanley, and Donald Waldman, *Promotion Tempo and Enlisted Retention*, Santa Monica, CA: RAND, R-4135-FMP, 1992.
- Defense Science Board Task Force on Human Resources Strategy, Office of the Undersecretary of Defense for Acquisition, Technology, and Logistics, Washington, DC, February 2000.
- Hosek, James, and Jennifer Sharp, *Keeping Military Pay Competitive: The Outlook for Military Pay and Its Consequences*, Santa Monica, CA: RAND, IP-205, 2001.
- Junor, Laura, and Jessica Oi, *A New Approach to Modeling Ship Readiness*, Alexandria, VA: Center for Naval Analyses, CRM-95-239, 1996.
- Orvis, Bruce, Michael Childress, and J. Michael Polich, *Effect of Personnel Quality on the Performance of PATRIOT Air Defense System Operators*, Santa Monica, CA: RAND, R-3901-A, 1992.
- Population Representation in the Military Services 1997*, Office of the Assistant Secretary of Defense (Force Management Policy), Washington, DC, November 1998.
- Scribner, Barry, David Smith, Robert Baldwin, and Robert Phillips, "Are Smart Tankers Better? AFQT and Military Productivity," *Armed Forces and Society*, Vol. 12, 1986, pp 194-206.

- Warner, John T., and Saul Pleeter, "The Personal Discount Rate: Evidence from Military Downsizing Programs," *American Economic Review*, March 2001.
- Warner, John T., Curtis J. Simon, and Deborah M. Payne, *Enlistment Supply in the 1990s: A Study of the Navy College Fund and Other Enlistment Incentive Programs*, DMDC Report No. 2000-015, Arlington, VA: Defense Manpower Data Center, January 2001.
- Winkler, John, Judith Fernandez, and J. Michael Polich, *Effect of Aptitude on the Performance of Army Communications Operators*, Santa Monica, CA: RAND, R-4143-A, 1992.